



RECOMMENDED BEST MANAGEMENT PRACTICES for Pueblo Goldenweed (Oönopsis puebloensis)

Practices to Reduce the Impacts of Road Maintenance Activities to Plants of Concern

CNHP's mission: We advance conservation of Colorado's native species and ecosystems through science, planning, and education for the benefit of current and future generations.

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Report Prepared for: the Colorado Natural Areas Program

Recommended Citation:

Panjabi, S.S. and G. Smith, 2017. Recommended best management practices for Pueblo goldenweed (*Oönopsis puebloensis*) practices to reduce the impacts of road maintenance activities to plants of concern. Colorado Natural Heritage Program, Colorado State University, Fort Collins, Colorado.

Front Cover: *Oönopsis puebloensis* plants and habitat, from top to bottom, © Georgia Doyle, Susan Panjabi, and Susan Panjabi

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June 2017

ACKNOWLEDGEMENTS

Funding for this important project was provided by the Colorado Natural Areas Program (CNAP).

We appreciate the input of numerous individuals during the preparation of this document, especially Raquel Wertsbaugh, Jessica Smith, Brian Elliott, Jill Handwerk, Bernadette Kuhn, and Ann M. Grant. Special thanks to Cora Marrama for making the Special Management Area maps.

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INTRODUCTION

Pueblo goldenweed (*Oönopsis puebloensis*) is a yellow flowered plant in the Asteraceae (Sunflower Family) that is known only from the Arkansas Valley in Pueblo and Fremont counties, Colorado, and is considered to be imperiled at a global and state level (G2/S2; Colorado Natural Heritage Program 2017). One of the biggest conservation issues for this imperiled plant species is the lack of awareness of its existence and status. Avoiding or minimizing impacts to this species during road maintenance activities will effectively help to conserve its habitat and is unlikely to confer substantial impacts on road maintenance goals and projects. The Best Management Practices (BMPs) included in this document are intended to help increase the awareness of this species for anyone involved in road maintenance activities.

The desired outcome of these recommended BMPs is to reduce significantly the impacts of road maintenance activities to the Pueblo goldenweed on federal, state, and/or private land. The BMPs listed here are intended to be iterative, and to evolve over time as additional information about the Pueblo goldenweed becomes available, or as road maintenance technologies develop.

The intent of these BMPs is to inform people working along roadside areas regarding the importance of Pueblo goldenweed, one of Colorado's botanical treasures, and to outline some of the ways in which this species can coexist with road maintenance activities. The implementation of these recommendations will help to assure that maintenance activities proceed without unintended harm to these globally imperiled plants. A summary checklist of BMPs is presented in **Appendix One**.

BEST MANAGEMENT PRACTICES FOR PUEBLO GOLDENWEED (*OÖNOPSIS PUEBLOENSIS*)

- 1. Gather mapped location information for Pueblo goldenweed along roadsides (within 20 meters/22 yards of all roads: CDOT, County, USFS, BLM, and municipalities) consulting with the Colorado Natural Heritage Program (CNHP) at Colorado State University, local herbaria, and other known sources of rare plant location data. In 2014 and 2016 this step was conducted by the Colorado Natural Heritage Program as part of a pilot project to conserve roadside populations of globally imperiled plants (Panjabi and Smith 2014).
- Work with the Colorado Natural Heritage Program to create Special Management Areas based on the distribution of Pueblo goldenweed within 20 meters/22 yards of roads.
 Special Management Areas (maps and data tables) are presented in Appendix Two if a data sharing agreement has been signed with the Colorado Natural Heritage Program.

- 3. Prior to road maintenance work, the field supervisor (CDOT) or land manager (County, BLM, etc.) should provide maps to road crews showing all known Special Management Areas for the plants (as hard-copy and GIS files, and including the UTMs indicating the extent of the Special Management Areas along roads). The maps and other data should be "species blind"; they should *not* indicate what species are found within the Special Management Areas (Pueblo goldenweed as well as other rare taxa). The maps should be updated as new plant locations are found.
- 4. Within the Special Management Areas the roadsides should not be seeded, sprayed or mowed to avoid disturbance to soils, plants, and habitat. This includes all brush control, fire control, and weed control. (For appropriate management of noxious weeds, please refer to the Noxious Weed Management section below.) Dust abatement applications, if necessary, should be comprised of water only, with use of magnesium chloride limited to the minimum extent necessary.
- If mowing is necessary, for example for safety reasons, avoid mowing from May 1-August 31. If mowing is necessary during May 1-August 31, mow with as high of a blade height as practicable, and do not drive over/park on top of the plants.
- 6. If grading is necessary, following rain or other events that wash out roads, avoid burying the rare plants.
- 7. Snow and ice control measures present some concerns for the Special Management Areas, though public safety is a priority. When possible, plowing, deicer and sand applications, rock slide removal, snow fence maintenance and construction activities should consider the locations of the Special Management Areas. For example, sand applications could cover plants when the snow melts and should be avoided if possible.
- 8. Locating signs away from Special Management Areas would benefit the Pueblo goldenweed. If guardrails need to be installed/repaired, minimize impacts to the goldenweed to the greatest extent possible.
- 9. Minimizing and/or discouraging the use of vehicle pull-off and turn-around areas where the rare plants are present would also be beneficial. Proper signage, fencing, obstacles (boulders) are all possible solutions.
- 10. Transplanting is not recommended under any circumstances.
- 11. Develop monitoring plans for the roadside locations of Pueblo goldenweed, with the goals of detecting any decrease in the population size or condition, and/or needs for restoration efforts and/or noxious weed management.

- 12. Minimize impacts to Pueblo goldenweed habitat through appropriate and creative project planning. Some examples of appropriate and creative project planning include:
- Wash vehicles and other equipment to reduce the spread of noxious weeds from other areas.
- Assure that straw and hay bales used for erosion control are certified free of noxious weeds.
- Contact the Colorado Natural Heritage Program at Colorado State University when planning ground breaking activities at or near (within 200 meters/218 yards of) Pueblo goldenweed sites.

NOXIOUS WEED MANAGEMENT IN HABITAT FOR PUEBLO GOLDENWEED (*OÖNOPSIS PUEBLOENSIS*)

- 1. Document, map, monitor and control all infestations of noxious weeds (Colorado Noxious Weed Act 2003) and other non-native invasive plant species in and adjacent to occupied habitat for Pueblo goldenweed. The Colorado Noxious Weed List can be found online at: https://www.colorado.gov/pacific/agconservation/noxious-weed-species
- 2. Monitor Special Management Areas for new weed infestations. Noxious weeds in close proximity (within 400–800 meters/437-875 yards) to the plants of concern should be the highest priority for control. Ensure that the rare plants are protected from any damage resulting from weed control efforts.
- 3. Control noxious weeds using integrated techniques. Limit chemical control in areas within 200 meters/218 yards of rare plant species to avoid damage to non-target species. Mechanical or chemical control in and near rare plant habitat should only be implemented by personnel familiar with the rare plants.
- 4. Herbicide application should be kept at least 200 meters/218 yards from known plant populations, except in instances where weed populations threaten habitat integrity or plant populations. Great care should be used to avoid pesticide drift in those cases.
- 5. For further information on managing weeds in the vicinity of rare plant populations please see the Recommended Best Management Practices for Managing Noxious Weeds on Sites with Rare Plants (Mui and Panjabi 2016). Link provided here: http://www.cnhp.colostate.edu/download/documents/2016/BMP Noxious Weeds on Site http://www.cnhp.colostate.edu/download/documents/2016.pdf.

OTHER NEEDS AND RECOMMENDED GUIDELINES

Further inventory, monitoring, research, and conservation planning is recommended for the Pueblo goldenweed to assist with future development and implementation of these Best Management Practices (BMPs), as well as our basic understanding of this rare species. As we work to manage for the long-term viability of the Pueblo goldenweed it will be important to conduct botanical surveys (inventories) and map new locations to improve our understanding about how roadside locations contribute to full species distribution. Inventory work may also help to identify sites that could be suitable for conservation efforts. Monitoring roadside locations is important to determine if the BMPs are effective, and clarify the conservation status of the species. Research into pollination ecology, recommended setbacks, and phenology is also suggested. As these research efforts are undertaken, the following recommendations can help assure high quality results that will be most useful in conservation planning activities.

- 1. Botanical field surveys should be conducted by qualified individual(s) with botanical expertise, according to commonly accepted survey protocols, and using suitable GPS equipment. The Colorado Natural Heritage Program (CNHP) at Colorado State University can provide references, field forms, etc. Surveys should be repeated at least once every 10 years. Prioritize surveys on preferred geologic substrates within species range.
- 2. Botanical field surveys should be conducted during June through August when the Pueblo goldenweed can be detected and accurately identified. In some cases multi-year surveys may be necessary, e.g., if drought conditions occur during the survey window.
- 3. If Pueblo goldenweed (or other species of concern) are found within the survey area, the botanist should endeavor to determine the complete extent of the occurrence and the approximate number of individuals within the occurrence. Ideally, occurrences should be delineated by GPS and the results imported to GIS for inclusion on updated project maps.
- 4. Field survey results should be reported to CNHP, and to appropriate land managers. A photograph or voucher specimen (if sufficient individuals are present) should be taken. Vouchers should be deposited in one of Colorado's major herbaria (e.g., University of Colorado, Colorado State University, Denver Botanic Gardens). Negative results of surveys should also be reported to CNHP.
- 5. Perform frequent and timely inspections of development sites and plants of concern occurrences to ensure that BMPs are being followed, and to identify areas of potential conflict. Inspections of plant occurrences should be performed by a botanist or other qualified personnel.

- 6. Monitoring is more likely to succeed if properly planned. Collection of baseline data, prior to any impact, is vital. Although land management agencies may have specific monitoring guidelines, an excellent reference for developing and implementing a monitoring plan is Elzinga et al. (1997).
- 7. Monitor impacts on plants of concern from road maintenance or other activities in the area. If impacts are noted, change management to address the cause of impacts.
- 8. Develop and implement monitoring plans for noxious weeds. Plans should be designed to detect new infestations and document the extent and spread of existing weeds.

SPECIES PROFILE

Oönopsis puebloensis

(Pueblo Goldenweed)

Asteraceae (Sunflower Family)



Close up of Pueblo goldenweed (Oönopsis puebloensis) in flower by Susan Panjabi.



Close up of Pueblo goldenweed (Oönopsis puebloensis) in flower by Susan Panjabi.



Close up of Pueblo goldenweed (Oönopsis puebloensis) in flower by Susan Panjabi.

Ranks and Status

Global rank: G2 State rank: S2 Federal protection status: None State protection status: None

Description and Phenology

General description: Pueblo goldenweed (*Oonopsis puebloensis*) is a low-growing (1-6 dm tall) perennial sub-shrub, with leafy stems topped by yellow ray and disk flowers and strongly reflexed phyllaries. The leaves are linear-lanceolate to linear-oblanceolate, and alternate on the stems. Stems and leaves are covered with fine, soft hairs. The woody stalk persists. The usually solitary heads have both disc and ray flowers with the ray flowers numbering 12-30 (Brown 1993, Spackman et al. 1997, Ackerfield 2015).

Look Alikes: *Oönopsis puebloensis* could be confused with *O. foliosa* which also grows in similar habitats, but has smooth or barely hairy leaves. The plants are taller, with 2-6 flowerheads per stem, and the phyllaries are not reflexed. *Oönopsis foliosa* also has a wider range (Brown 1993, Spackman et al. 1997).

Phenology: Flowers June-August (Ackerfield 2015).

Habitat



Habitat of Pueblo goldenweed (Oönopsis puebloensis) by Susan Panjabi

Habitat description: This species is found on barren shale outcrops of the Smoky Hill member of the Niobrara Formation in sparse shrublands or pinyon-juniper woodlands. Associated taxa

include: Frankenia jamesii, Oryzopsis hymenoides, Artemesia biglovii, Penstemon versicolor, as well as several other rare plants such as Mirabilis (Oxybaphus) rotundifolia, Oenothera harringtonii, and Parthenium (Bolophyta) tetraneuris.

Elevation Range: 4,835-6,118 feet; 1,474-1,865 meters

Distribution

Colorado endemic: Yes

Global range: An edaphic endemic found only on the Smoky Hill member of the Niobrara Shale Formation. Known from Fremont and Pueblo counties, Colorado. Estimated range is 905 square kilometers (349 square miles), calculated in GIS in 2008 by the Colorado Natural Heritage Program by drawing a minimum convex polygon around the known occurrences. Recent unverified reports from El Paso County expand this range slightly to the north.



(Distribution map of Pueblo goldenweed *(Oönopsis puebloensis)* in Colorado. This species is known from Colorado and nowhere else in the world.

Threats and Management Issues

The major threats to *Oonopsis puebloensis* are from excavation by a local cement plant and development of the species' habitat for housing. These threats have been documented for the other rare endemic plant species inhabiting the same shale habitat. The shale substrates occur mostly on private land, much of it owned by a local cement plant and used for mining subsurficial limestone. In addition, residential development associated with the cities of Pueblo, Pueblo West, Penrose, Portland, Florence, and Canon City are expanding into the area. The Niobrara shale is exposed on the surface in a fairly restricted area west of Pueblo, and it is on these exposed surfaces that other endemic plant species occur. The cement plant is located in the area because of the ease of mining limestone from these exposed surfaces. Without protection planning, habitat for the rare plant species, including *Oonopsis puebloensis*, could become so restricted and fragmented that viable populations cannot be sustained.

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APPENDIX ONE-SMA BMP CHECKLIST

This checklist is intended as a reminder for the Best Management Practices (BMPs) presented in the full report above that are recommended for the Special Management Areas (SMAs) presented in Appendix Two. Please see the full report for further details about the recommended BMPs listed here.

- 1. Avoid seeding, spraying, and mowing.
- If mowing is necessary, avoid mowing during the "No Mowing Dates". If mowing is necessary during the "No Mow Dates", mow with as high of a blade height as practicable, and do not drive over/park on top of the plants.
- 3. If weed control is necessary, use integrated techniques that are implemented by personnel familiar with the rare plants.
- 4. Avoid burying plants.
- 5. Plowing, deicer and sand applications, rock slide removal, snow fence maintenance and construction activities should consider the locations of the SMAs.
- 6. Locate signs and guardrails away from SMAs to the greatest extent possible.
- 7. Minimize the use of vehicle pull-off and turn-around areas in SMAs.
- 8. Do not transplant rare plants.
- 9. Monitor rare plant occurrences within SMAs.
- 10. Monitor SMAs for new weed infestations.
- 11. Wash vehicles and other equipment to reduce the spread of noxious weeds from other areas.
- 12. Assure that straw and hay bales used for erosion control are certified free of noxious weeds.
- 13. Contact the Colorado Natural Heritage Program at Colorado State University when planning ground breaking activities in SMAs.

APPENDIX TWO-SPECIAL MANAGEMENT AREAS

Maps and location specific information provided to project partners only.